

THE CLAIMS

What is claimed is:

1. A food processing system, comprising:
5 a fluid conduit configured for directing the food carried in a fluid medium along a food path;
a food inlet operatively associated with the fluid conduit for feeding the food into the conduit;
a pump operatively associated with the conduit for pumping the fluid
10 through the conduit in a fluid stream direction;
a processor unit associated with the conduit, disposed along the food path, and comprising a tool configured and associated with the conduit for performing a processing operation on the food; and
a deceleration element operatively associated with the conduit and
15 configured for decelerating the fluid and carried food along the food path while maintaining the fluid stream substantially free of recirculation vortices.

2. The system of claim 1, wherein the pump and conduit are configured such that the fluid enters the deceleration element at a first velocity, and the deceleration
20 element is configured for decelerating the fluid to a second velocity that is less than about 40% of the first velocity.

3. The system of claim 2, wherein the second velocity is less than about 20% of the first velocity.

4. The system of claim 1, wherein the deceleration element comprises a tapered conduit having a longitudinal axis along the food path and having an expansion
25 angle of about 4.5° or less.

5. The system of claim 1, wherein the deceleration element comprises a tapered conduit having a longitudinal axis along the food path and having an expansion
30 angle of about 3° or less.

6. The system of claim 5, wherein the tapered conduit of the deceleration element is substantially conical.

7. The system of claim 1, wherein the deceleration element comprises a tapered conduit having a longitudinal axis along the food path and having an expansion angle of about 2.5° or less.

8. The system of claim 1, wherein the deceleration element is configured to substantially eliminate any back flow of the fluid that is sufficient to significantly slow any of the carried food in relation to adjacent carried food disposed primarily outside said any back flow.

9. The system of claim 8, wherein the deceleration element is configured to substantially eliminate any back flow of the fluid that is sufficient to substantially stop or cause the carried food to move backwards compared to the stream direction.

10. The system of claim 1, wherein the deceleration element is configured for keeping the fluid flow substantially attached to the deceleration element and substantially free of flow separation.

11. The system of claim 1, wherein the deceleration element is disposed downstream from the processor unit along the food path.

12. The system of claim 1, wherein the processor unit comprises a cutter disposed along the food path and configured for cutting the food as it passes therethrough.

13. The system of claim 12, wherein the pump and conduit are configured for pumping the fluid and carried food along the food path at a sufficient speed for cutting the food at the cutter.

14. The system of claim 13, wherein the cutter comprises a plurality of stationary blades for cutting the food into longitudinal strips.

15. The system of claim 12, wherein:
the fluid is water;
the food comprises potatoes; and
the system is adapted for preparing french fries with decreased amounts of slivers and nubbins.

16. The system of claim 1, further comprising an alignment unit disposed upstream of the processor unit and configured for aligning and feeding the food in a predetermined orientation into to the processor unit.

17. The system of claim 1, further comprising a separating unit disposed along the food path and configured for separating the processed food from the fluid.

18. The system of claim 17, wherein the fluid conduit comprises a transition portion extending substantially from the deceleration element to the separating unit, wherein the transition portion is configured for maintaining the fluid flow substantially free of recirculation vortices.

19. The system of claim 1, wherein the fluid is water.

20. A food processing system, comprising:
a fluid conduit configured for directing the food carried in a fluid medium along a food path;
a food inlet operatively associated with the fluid conduit for feeding the food into the conduit;
a pump operatively associated with the conduit for pumping the fluid through the conduit in a fluid stream direction;

a processor unit device associated with the conduit, disposed along the food path, and comprising a tool configured and associated with the conduit for performing a processing operation on the food;

a deceleration element operatively associated with the conduit and
5 configured for decelerating the fluid and carried food along the food path;

a separating unit disposed along the food path and configured for separating the processed food from the fluid; and

a transition portion extending substantially from the deceleration element to the separating unit, wherein the transition portion is configured for maintaining the fluid
10 flow substantially free of recirculation vortices.

21. The system of claim 20, wherein the tool comprises a cutting device and any bends in the transition portion are configured to substantially prevent flow separation of the fluid.

22. The system of claim 20, wherein the tool comprises a cutting device and the transition portion is substantially straight.

23. A method of processing a food, comprising:
20 introducing food into a fluid;
feeding the fluid carrying the food through a food processor unit at a first velocity and conducting a food processing operation on the food;
decelerating the fluid carrying the food to a second velocity without producing substantial back flow of the fluid.

24. The method of claim 22, wherein the processing operation involves cutting the food as it passes through the food processor unit.

25. The method of claim 23, wherein the food comprises potatoes and
30 which are cut into french fries having decreased amounts of slivers and nubbins.